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ABSTRACT

A high-strength and high-fatigue-strength steel having a base metal strength of 1000 MPa or more and a rotating bending fatigue strength of 550 MPa or more is provided. The steel contains 0.3-0.8 percent by mass of C, 0.01-0.9 percent by mass of Si, 0.01-2.0 percent by mass of Mn, and Fe and unavoidable impurities as the remainder. The steel has a ferrite-cementite structure having a grain size of 7 μm or less or a ferrite-cementite-pearlite structure having a grain size of 7 μm or less. A surface metal of the steel after high-frequency induction quenching has a martensite structure having a prior austenite grain size of 12 μm or less. Alternatively, a surface metal of the steel after nitriding has a fine structure having a ferrite grain size of 10 μm or less.